

# Fusing surface and satellite-derived PM observations to determine the impact of international transport on coastal PM<sub>2.5</sub> concentrations in the western U.S.

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## What we plan to talk about

- Background
  - What are PM<sub>2.5</sub> and AOD?
- The Problem
  - Can we use PM measurements to predict past and/or future PM measurements?
  - Can we construct a model to predict PM from AOD measurements?
  - Is there an impact of PM from international sources?
- Data Sources
  - PM sites and data
  - AOD data
  - Other covariates
- Methods
- Models
- Experiments
- Conclusion

# Background

- Clean Air Act
  - California violates it
  - China to blame?
- Measure pollutants on land, near California coast
- Compare with satellite measurements
- informative picture - LA smog

## PM and AOD

- PM<sub>2.5</sub> is a particulate matter that is less than 2.5 micrometers in diameter.
- add hair picture - PM 2.5 vs PM 10
- Aerosol Optical Depth (AOD) measures the amount of light from the sun blocked by dust and pollutants.

- add picture of sites - all sites on west coast, Hawaii
- Ground sites of  $\text{PM}_{2.5}$  measurements, as collected by EPA
- Data collected either daily, every three days or every six days.

## AOD

- add picture of strip of data
- our AOD data only over Pacific Ocean
- satellites travel around the Earth once every 16 days.
- AOD data is collected at each location least twice a month.

## Data Cleaning

- picked PM sites closest to coast (13 in California, 9 in Hawaii)
- add map with sites we chose
- Found closest locations of AOD measurements to these sites
- Matched data by date of AOD/PM readings

## Covariates

- wind speed and direction
- humidity
- planetary boundary layer height
- air temperature
- added values of these measures at each location at each date



# Models

- PM<sub>2.5</sub> time series
- add gif here

# Models

- Spatial Interpolation of  $PM_{2.5}$
- add gif/image here

# Models

- Relationships between AVHRR AOD and surface PM
- Yu - add stuff



## Conclusions

## Future work

# Acknowledgments

- faculty mentors
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- NSF

## References



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